

WHAT IS CLAIMED IS:

1. A system for forming ball grid array packages, comprising:  
a substrate;  
a stencil engaging a first surface of the substrate, the stencil  
5 comprising:  
a center region having a first set of generally circular holes  
formed therein; and  
a first outer region disposed radially outwardly from the center  
region and having a second set of generally circular holes formed therein,  
10 wherein the diameter of each of the generally circular holes of the second set  
is greater than the diameter of each of the generally circular holes of the first  
set;  
a solder paste disposed outwardly from the stencil; and  
a squeegee operable to spread the solder paste over the stencil to fill  
15 the first and second set of generally circular holes, thereby creating a plurality  
of solder paste regions.

2. The system of Claim 1, further comprising a plurality of solder balls  
configured to couple to respective ones of the solder paste regions.

3. The system of Claim 1, wherein the diameter of each of the generally  
circular holes of the second set is approximately ten to twenty percent greater than the  
diameter of each of the generally circular holes of the first set.

4. The system of Claim 1, wherein the stencil comprises a second outer  
region disposed radially outwardly from the first outer region and having a third set of  
generally circular holes formed therein, wherein the diameter of each of generally  
circular holes of the third set is greater than the diameter of each of the generally  
circular holes of the second set.

5. The system of Claim 4, wherein the diameter of each of the generally circular holes of the third set is approximately five to ten percent greater than the diameter of each of the generally circular holes of the second set.

5 6. The system of Claim 1, wherein the stencil has a generally square shape.

7. The system of Claim 6, wherein center region is generally square shaped, and the first outer region is generally square shaped and oriented  
10 approximately 45 degrees with respect to the center region.

8. The system of Claim 6, wherein the first and second set of generally circular holes are aligned in rows and columns, wherein a pitch between adjacent generally circular holes is between approximately 0.5 millimeter and 0.1 millimeter.

9. A method for forming ball grid array packages, comprising:  
providing a substrate;  
engaging a stencil with a first surface of the substrate, the stencil  
comprising:

5 a center region having a first set of generally circular holes  
formed therein; and

a first outer region disposed radially outwardly from the center  
region and having a second set of generally circular holes formed therein,  
wherein the diameter of each of the generally circular holes of the second set  
10 is greater than the diameter of each of the generally circular holes of the first  
set;

depositing solder paste over the stencil;

removing the stencil, thereby creating a plurality of solder paste  
regions on the substrate; and

15 coupling a plurality of solder balls to respective ones of the solder  
paste regions.

10. The method of Claim 9, wherein the diameter of each of the generally  
circular holes of the second set is approximately ten to twenty percent greater than the  
20 diameter of each of the generally circular holes of the first set.

11. The method of Claim 9, wherein the stencil comprises a second outer  
region disposed radially outwardly from the first outer region and having a third set of  
generally circular holes formed therein, wherein the diameter of each of generally  
25 circular holes of the third set is greater than the diameter of each of the generally  
circular holes of the second set.

12. The method of Claim 11, wherein the diameter of each of the generally  
circular holes of the third set is approximately five to ten percent greater than the  
30 diameter of each of the generally circular holes of the second set.

13. The method of Claim 9, further comprising providing the stencil with generally square shape.

14. The method of Claim 13, further comprising:  
providing the center region with a generally square shape;  
providing the first outer region with a generally square shape; and  
orienting the first outer region approximately 45 degrees with respect to the center region.

15. The method of Claim 9, further comprising aligning the first and second set of generally circular holes in rows and columns, wherein a pitch between adjacent generally circular holes is between approximately 0.5 millimeter and 0.9 millimeter.

16. A system for forming ball grid array packages, comprising:

a substrate;

a stencil engaging a first surface of the substrate, the stencil comprising a plurality of generally circular holes formed therein, the diameters of the generally circular holes generally increasing as the location of the generally circular holes extends farther from a center of the stencil and toward a perimeter of the stencil;

a solder paste disposed outwardly from the stencil; and

a squeegee operable to spread the solder paste over the stencil to fill the generally circular holes, thereby creating a plurality of solder paste regions.

17. The system of Claim 16, further comprising a plurality of solder balls configured to couple to respective ones of the solder paste regions.

18. The system of Claim 16, wherein the stencil has a generally square shape.

19. The system of Claim 18, wherein the generally circular holes are arranged in an array of rows and columns.

20. The system of Claim 19, wherein a pitch between adjacent generally circular holes is between approximately 0.5 millimeter and 0.1 millimeter.